INITIAL CERTIFICATION
RCRA HAZARDOUS WASTE TANK ASSESSMENT

ACCELERATED SLUDGE REMOVAL PROJECT
HAZARDOUS WASTE STORAGE TANKS

Tent No./Tank No./RCRA ID No./Serial No.

3/D-6/25.006/C93-03053
3/D-7/25.007/C93-02899
3/D-8/25.008/C93-02881
3/D-9/25.009/C93-02967
3/D-10/25.010/C93-02939
3/D-11/25.011/C93-03333

EG&G Subcontract #MTS 350370PA3

January 13, 1994

Prepared for: **EG&G Rocky Flats, Inc.**
Environmental Restoration Management
Solar Ponds Project Office
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ERM-Rocky Mountain Project No. R31206.0

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INITIAL TANK SYSTEM CERTIFICATION

RCRA HAZARDOUS WASTE TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3
January 13, 1994

This document is provided for the RCRA hazardous waste tank system described below, as requested in the Statement of Work for the Independent RCRA Certification of the Accelerated Sludge Removal Project, Hazardous Waste Storage Tank System, Revision No. 1. Project #MTS 350370PA3.

This document is a certification of the tank system by an independent, qualified, registered Colorado professional engineer with ERM-Rocky Mountain, Inc., and has been prepared in accordance with the applicable Colorado Hazardous Waste Regulations, 6 CCR 1007-3 Section 265.192, "Design and Installation of New Tank Systems or Components."

This is an initial tank certification which is restricted to the tank and does not include ancillary equipment. Minor discrepancies or operating limitations are listed below as qualifications to this certification.

TANK SYSTEM

Test No.	Tank No.	RCRA Id. No.	Serial No.	Qualifications
3	D-6	25.006	C93-03053	Manufacture date not marked on tank. Limit specific gravity (SG) of waste to 1.88, or fill only to 7 ft. for SG up to 1.9.
3	D-7	25.007	C93-02899	Limit specific gravity (SG) to 1.76, or fill only to 7 ft. for SG up to 1.9.
3	D-8	25.008	C93-02881	Limit specific gravity (SG) to 1.70, or fill only to 7 ft. for SG up to 1.9.
3	D-9	25.009	C93-02967	Limit specific gravity (SG) to 1.80, or fill only to 7 ft. for SG up to 1.9.

TANK SYSTEM (Continued)

Test No.	Tank No.	RCRA Id. No.	Serial No.	Qualifications
3	D-10	25.010	C93-02939	Wrong capacity marked on tank. Confined space entry not marked. Limit specific gravity (SG) to 1.89, or fill only to 7 ft. for SG up to 1.9.
3	D-11	25.011	C93-03333	Confined space entry not marked where visible. Manufacture date not marked on tank.

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

I hereby certify and attest, that the tank system has been examined in accordance with the regulations cited above and is assessed to be of sufficient structural integrity and is acceptable for the storing and treating of hazardous waste. This certification is based on the condition of the tank system at the time of investigation as described in the attached checklist and Initial Tank Certification Report.

Michael M Keller P.E

Colorado Professional Engineer Signature

Jan 13, 1994

Date

COLORADO REGISTERED
MICHAEL M. KELLER
13967
PROFESSIONAL ENGINEER

1.0 INTRODUCTION

The Rocky Flats Accelerated Sludge Removal Project (ASRP) has the objective to expeditiously remove approximately 900,000 gallons of waste materials from the 788 Clarifier and the 207 B South and C Ponds. These waste materials will be transferred via tank trucks to approximately 72 new polyethylene tanks located inside Tents 3, 4 and 6 on the 750 Pad.

DOE is requesting that the Colorado Department of Health (CDH) grant interim status to the polyethylene tanks that will be used for storage on the 750 Pad. DOE will later request a modification of the Rocky Flats Plant Part B permit to include these tanks. The tanks are currently subject to the requirements of Part 265, Subpart J of the Colorado Hazardous Waste Regulations, 6 CCR 1007-3. Section 265.192 requires that owners or operators of new tank systems obtain and submit to CDH a written assessment, reviewed and certified by an independent, qualified registered professional engineer, in accordance with Section 100.12(d) attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste.

This document provides ERM-Rocky Mountain's (ERM's) assessment and initial certification of a subset of the polyethylene tanks (see list of tanks on certification sheet). Section 1.0 provides background information on the ASRP, as well as an explanation of the driving forces behind the requirement for tank assessments. Section 2.0 details the scope of this certification. Section 3.0 summarizes the methodology that ERM used to perform the tank assessments. Section 4.0 presents observations during assessment activities, and provides discussions of qualifications listed on the certification sheet. Section 5.0 includes a discussion of ERM's independent calculations and the resulting qualifications on the certification of each tank.

2.0 *CERTIFICATION SCOPE*

ERM completed this initial certification of structural integrity for each tank vessel, to allow EG&G to place each individual tank in service in a timely manner. A qualified, Colorado registered professional engineer with ERM has reviewed and certified the assessment in accordance with Section 100.12(d) of 6 CCR 1007-3, attesting that the tank system has sufficient structural integrity and is acceptable for the storing and treating of hazardous waste as required under Section 265.192 of 6 CCR 1007-3.

ERM assessed the following items prior to preparing the initial certification:

- Design standards used to construct the tanks and ancillary equipment (265.192(a)(1)).
- Hazardous characteristics of the wastes to be handled (265.192(a)(2)).
- Design considerations used to ensure that tank systems will withstand the effects of frost heave (265.192(a)(5)(iii)).
- Design considerations used to ensure that tank foundations will maintain the load of a full tank (265.192(a)(5)(i)).
- Handling procedures used to prevent tank damage during installation (265.192(b)).
- Tank system integrity after installation through an inspection for weld breaks, punctures, scrapes of protective coatings, cracks, corrosion and other structural damage or inadequate construction or installation (265.192(b)(1-6)).
- Tightness of tanks and ancillary equipment prior to use (265.192(d)).

ERM will later prepare a final certification for all the tank systems, and provide a final report of all tank assessments, after assessing the following items:

- Design considerations used to ensure that tank systems will be anchored or spaced to prevent dislodgement where the tank system is placed in a seismic fault zone (265.192(a)(5)(ii)).

- Measures used to protect the ancillary equipment from physical damage and excessive stress due to settlement, vibration, expansion or contraction (265.192(e)).

3.0 METHODOLOGY

In accordance with the "RCRA Tank Assessment Plan" (ERM 1993), ERM used a phased approach in performing the assessments on the ASRP polyethylene tanks. ERM first conducted a site visit to the Poly Cal Plastic facility in French Camp, California to verify tank manufacturing, testing and packaging procedures, and to obtain additional tank data. Concurrently, ERM began reviewing existing information, including the ASRP design criteria and the available waste characterization data. As EG&G received the tanks at the Rocky Flats Plant, ERM observed EG&G's receipt inspections to check for damage to the tanks and to ensure that the proper shipping requirements were met. During the construction phase of the ASRP, ERM was present to observe the installation and testing of the tanks.

4.0 OBSERVATIONS

ERM used checklists to assess compliance with design, material testing, delivery, and documentation requirements. The completed checklists are included in Appendices A, B and C.

4.1 Vendor Site Visit

Two engineers from ERM visited the Poly Cal Plastics manufacturing facility in French Camp, California on December 2 and 3, 1993. Appendix A contains the checklist completed for the site visit. Summary comments are provided below.

The vendor is a well-established manufacturer of polyethylene tanks. They have a permanent manufacturing facility for production and testing of the large diameter tanks specified for this project. Quality control procedures are in place to perform and

document the testing required by the ASTM standard for each tank produced. Shipping and handling procedures have been developed for off-loading and placement to prevent tank damage. As-built drawings are provided with each tank to verify compliance with the ASTM standard. Permanent tank markings identify the manufacturer, date of manufacture, capacity, maximum specific gravity allowed for tank design, and an individual serial number. All quality control documentation will be provided to Rocky Flats Plan for a permanent record.

4.2 Information Review

ERM performed independent calculations and also checked the existing engineering data and calculations for accuracy and completeness. The results of the information review are shown on the checklist presented in Appendix B. A discussion of ERM's independent calculations is provided in Section 5.0.

4.3 Shipping/Delivery/Installation Oversight

ERM observed EG&G's tank receiving inspections and reviewed EG&G's quality inspection documentation. During installation of the tanks ERM, focused on tank integrity and installation requirements. Appendix C contains the checklists completed for this oversight. A summary table of hydrostatic testing results following tank installation is provided in Appendix D.

Some of the qualifications listed on the certification sheet are related to tank markings. The missing markings do not affect the structural integrity of the tanks, although the markings should be corrected as soon as possible.

5.0 *QUALIFICATIONS BASED ON INDEPENDENT CALCULATIONS*

This section provides a discussion of ERM's independent calculations related to tank wall thickness requirements. The resulting limitations on tank fill height or specific gravity of the waste are listed as qualifications in the certification sheet.

Calculation of Hydrostatic Design Stress

ERM's independent calculation of hydrostatic design stress (SD) resulted in a value of 593 psi (hydrostatic design basis of 1250 psi multiplied by service factor of 0.475 as shown in Appendix B). This SD value is less than the 630 psi value calculated by Paxon Polymer Company (1992) using a service factor of 0.5. A service factor of 0.475 is required for wall thicknesses greater than 0.375 inches (ASTM 1998-91). Therefore, ERM used an SD value of 593 psi for independent calculations of required wall thicknesses. The revised service factor results in slight increases in the design thicknesses.

Effect of Storing Organic Compounds

Section 6.6.3 Corrosion Report contains a memo from R.G. Posgay and H.H. Butler to J.H. Templeton, dated August 18, 1993, entitled "Corrosion Evaluation of Polyethylene Containers for Storage of Pond 'C' Water and Sludge". The memo contains a discussion of chemicals which may be absorbed into the polyethylene. The author estimated that 9.94 pounds of TOC may exist at the waterline in any given tank. Since this weight is greater than 7% of the weight (36.7 pounds) of the polyethylene in a six-inch band around the tank, the author states that the material may absorb TOC and lose 10% of its tensile strength.

ERM reviewed a "General Chemical Resistance Chart for High Density Crosslink Polyethylene Tanks" for Marlex CL-100 and CL-50. Table III of this chart states that the material is generally not recommended for use above 100 degrees F with organic

chemicals. ERM also reviewed literature from the Paxon Polymer Company chemical resistance. A table on solvents listed a 7% permeation loss after 30 days of storage of carbon tetrachloride. Therefore, ERM concluded that a reduction in design stress may be warranted for the waterline. This reduction would result in an increase of 11% in the required wall thickness. However, for all the tanks certified in this document, the wall thickness of the top half of the tank meets or exceeds this requirement. It is assumed that the waterline will be maintained within the top half of tanks during normal storage.

Calculation of Tank Wall Thicknesses

Using an assumed specific gravity of 1.9 (maximum allowed in tank), an SD value of 593 psi, and updated outside diameters, ERM calculated required wall thicknesses for the primary and secondary tanks at various sidewall heights (see Appendix B). Actual wall thicknesses provided in the quality assurance documentation provided by the manufacturer were compared to these requirements (see Appendix C). Five tanks (listed below) showed one or more measurement points within the design tolerance (±20% of design thickness), although thinner than the design thickness. Because of the wide spacing of measurement points (every two feet in height and at four radial points around the circumference), it is possible that even one non-compliance point may result in more than 10% or 1.0 square ft. of the tank wall area as too thin.

As a result of the above determinations, the specific gravity of the materials placed in the tanks must be limited as listed below. Alternatively, a material with a specific gravity of 1.9 may be placed in the tank to a maximum height of 7.0 ft. Additional wall thickness measurements in the areas of concern may be used to further refine or eliminate these limitations (eg., if non-compliance areas are less than 10% of the total area or individual areas are less than 1.0 square ft.).

Tank	Serial No.	Maximum SG (Fill to 10 ft)
D-6	C93-03053	1.88
D-7	C93-02899	1.76
D-8	C93-02881	1.70
D-9	C93-02967	1.80
D-10	C93-02939	1.89

6.0 *REFERENCES*

ASTM. 1991. Standard Specification for Polyethylene Upright Storage Tanks. ASTM Designation 1998-91. American Society for Testing and Materials, Philadelphia, Pa.

ERM-Rocky Mountain, Inc. December 15, 1993. RCRA Tank Assessment Plan, Independent RCRA Certification of Accelerated Sludge Removal Project, Hazardous Waste Storage Tank System, Rocky Flats Project, Solar Ponds Project. Prepared for EG&G Rocky Flats, Inc., Environmental Restoration Management, Solar Ponds Project Office, Building 80, P.O. Box 464, Golden, CO 80402-0464. EG&G Subcontract #MTS 350370PA3.

Paxon Polymer Company. 1992. Letter, Mr. Joe Joshi, to Mr. Guy Carrow, Poly Processing Company, Monroe, LA, dated September 30, 1992.

APPENDIX A
VENDOR SITE VISIT CHECKLIST

VENDOR SITE VISIT CHECKLIST

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: R. Hea / M. Keller
Date: 12/2/93
Location: PolyCal Plastics, French Camp, CA

	Yes	No	N/A
1. Has the tank manufacturer demonstrated experience in the manufacturing of cross-linkable polyethylene tanks of similar size and service?	☒	☐	☐
2. Does the manufacturer have the capability to correlate all production and process parameters and all quality control information to a unique serial number stamped on the tank?	☒	☐	☐
3. Does the manufacturer supply handling procedures to the user for off-loading and placement to prevent tank damage?	☒	☐	☐
4. Are manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both primary and secondary tanks)?	☒	☐	☐
5. Is a "Certificate of Compliance" being submitted with each tank on manufacturer's letterhead stating the following?:	☒	☐	☐
a. Purchase Order number.	☒	☐	☐
b. Test performed and to which Standard or Procedure.	☒	☐	☐
c. Test results.	☒	☐	☐
6. Are the ASRP tanks molded from high density cross-linkable polyethylene (HDXLPE)?	☒	☐	☐
7. Are the ASRP tanks manufactured from virgin polyethylene material?	☒	☐	☐
8. Are the tanks manufactured by the rotational molding process outlined in ASTM D 1998-91?	☒	☐	☐
9. Do tanks contain an ultraviolet stabilizer?	☒	☐	☐
9a. If so, is the stabilizer present at a level adequate to give protection for the intended service life of the tank?	☒	☐	☐
9b. Is the stabilizer compounded in the polyethylene?	☒	☐	☐
10. Are pigments added to the polyethylene?	☒	☐	☐
10a. If so, are they compatible with the polyethylene, and do they not exceed 0.5% dry blended and 2% compounded in, or total weight?	☒	☐	☐
11. Is the top head integrally molded with the cylinder shell?	☒	☐	☐
11a. Is the minimum thickness of the top head equal to the thickness at the top of the straight wall?	☒	☐	☐

	Yes	No	N/A
12. Is the thickness for a full-supported flat-bottom head a minimum of 0.187 in.?	☒	☐	☐
12a. Is the radius of the bottom knuckle of a flat-bottom tank a minimum of 1.5 inches?	☒	☐	☐
12b. Is the minimum thickness of the radius greater than or equal to the maximum thickness of the cylinder wall?	☒	☐	☐
13. Is the top edge of the secondary tanks reinforced by design to maintain its shape after installation?	☒	☐	☐
14. Are all dimensions measured externally with an empty tank in the vertical position?	☒	☐	☐
15. Is the manufacturer checking and documenting tolerances?	☒	☐	☐
15a. Are these tolerances in accordance with ASTM D 1998-91?	☒	☐	☐
16. Are tank capacities based on total tank volume?	☒	☐	☐
17. Are the tanks visually inspected to ensure that the tank walls are free of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, craters, cracks and delamination?	☒	☐	☐
18. Are the tanks permanently marked to identify the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design (1.9)	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
19. Will confined space entry warning signs as prescribed by OSHA Standard 29 CFR 1910. 106 be affixed to the tanks?	☒	☐	☐
20. Are chemical-resistance charts available for the polyethylene material used in the tank fabrication?	☒	☐	☐
21. Will the manufacturer supply wall thickness readings along the straight wall and bottom of both the primary and secondary tanks?	☒	☐	☐
22. Will these readings be recorded on the shop traveler for submittal to the user?	☒	☐	☐
23. Do the shop drawings provided by the tank manufacturer have the necessary information to verify compliance with ASTM D 1998-91?	☒	☐	☐
24. Are test specimens taken from the man-way, fittings cut-out, or other representative areas?	☒	☐	☐
25. Does the manufacturer have a program to ensure calibration of all equipment prior to commencing fabrication and testing?	☒	☐	☐
26. Is hydrostatic-hoop-stress data available for the resin used in the tanks?	☒	☐	☐
27. Is stress-cracking resistance data available?	☒	☐	☐

	Yes	No	N/A
28. Is equipment available to perform impact tests in accordance with ASTM D 1998-91?	☒	☐	☐
28a. Are results from the low temperature impact test of Section 11.3 of ASTM D 1998-91 documented?	☒	☐	☐
29. Is equipment available to perform Gel Tests in accordance with ASTM D 1998-91? At Poly Processing in Louisiana	☒	☐	☐
29a. Are results from the Gel Test of Section 11.4 of ASTM D 1998-91 documented?	☒	☐	☐
30. Is equipment available to perform hydrostatic tests on each tank?	☒	☐	☐
30a. Are the hydrostatic tests performed for a minimum of 30 minutes per tank and are the tanks checked for leakage?	☒	☐	☐
30b. Are results from the hydrostatic test documented?	☒	☐	☐
31. Are holes cut to be free of sharp corners?	☒	☐	☐
31a. Are holes cut to have a minimum clearance to ensure best fit?	☒	☐	☐
32. Are the size, location and specification for man-ways and fittings as agreed upon by RFP?	☒	☐	☐
33. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
34. Are the fill assemblies being installed at the manufacturer's site?	☒	☐	☐
35. Do vents comply with OSHA 1910.106 (or other accepted standard) for normal venting for atmospheric tanks?	☒	☐	☐
35a. If not, are vents at least as large as the fitting or withdrawal connection, whichever is larger, but not less than 1.0 inch nominal inside diameter?	☐	☐	☒
36. Are fittings of appropriate strength to meet manufacturer and RFP specifications?	☒	☐	☐
37. Does manufacturer provide tanks with a means for overfill protection?	☒	☐	☐

Comments: (1) These observations are based on the inspection and review of production and testing processes, along with the initial production tanks.

APPENDIX B

INFORMATION REVIEW CHECKLIST

INFORMATION REVIEW CHECKLIST

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Reviewer(s): Pamela J. Mitchell P.E., Mike Keller, P.E.
Date(s): 1/13/94

	Yes	No	N/A
TANK DESIGN			
1. Is the design height for the primary tank less than or equal to 12 feet?	☒	☐	☐
2. Is the design diameter for the secondary tank less than or equal to 14 feet?	☒	☐	☐
3. Are the secondary containment tanks designed to contain at least 100% capacity of the primary tank?	☒	☐	☐
4. Is the design volume for each of the primary tanks approximately 11,150 gallons?	☒	☐	☐
5. Is the design volume for each of the secondary tanks approximately 12,025 gallons?	☒	☐	☐
6. Do the polyethylene's stress-cracking resistance tests indicate a 50% failure point at a minimum of 500 hours in accordance with Test Method D 1693, Condition A, full-strength stress-cracking agent?	☒	☐	☐
7. Is the density of the tank polyethylene material within the acceptable design range?	☒	☐	☐
8. Is the ultimate tensile strength of the tank polyethylene material within the acceptable design range?	☒	☐	☐
9. Is the elongation at break of the tank polyethylene material within the acceptable design range?	☒	☐	☐
10. Is the vicat softening temperature of the tank polyethylene material within the acceptable design range?	☒	☐	☐
11. Is the brittleness temperature of the tank polyethylene material within the acceptable design range?	☒	☐	☐
12. Is the flexural modulus of the tank polyethylene material within the acceptable design range?	☒	☐	☐

	Yes	No	N/A
13. Was the formula in Section 6.1 of ASTM D 1998-91 used correctly to calculate the minimum required wall thickness of the cylindrical shell at any fluid level?	☒	☐	☐
13a. Have ±20% of the design thickness ranges been established, for comparison with actual tank thicknesses?	☒	☐	☐
14. Was the hydrostatic-design-stress calculated correctly in accordance with Section 6.1.1 of ASTM D 1998-91? incorrect Service factor	☐	☒	☐
14a. Are the tanks designed with the appropriate design hoop stress value and an adequate safety factor, using the Barlow formula for calculating wall thickness in accordance with ASTM D 1998-91?	☐	☒	☐
14b. Was the tank hoop stress derated for service above 73.4°F and does the derated hoop stress exceed the hydrostatic-design-stress?	☐	☒	☐
15. Is the tank designed of sufficient structural strength, in accordance with ASTM D 1998-91 standards, to contain contents with a specific gravity of 1.9 using an appropriate safety factor? with fill height or S.G. qualifications	☒	☐	☐
16. Are the seismic designs of the tanks in accordance with University of California Research Laboratory (UCRL)-15910 and RFP Standard SC-106 and are they specified for Important/Low Hazard usage category?	☒	☐	☐
17. Are the tank stresses due to static, hydrostatic, and hydrodynamic forces evaluated against the tank material allowable?	☒	☐	☐
18. Are all design calculations stamped by a Registered Professional Engineer?	☐	☒	☐
19. Is the manufacturer equipped to perform the Low Temperature Impact Test in accordance with Section 11.3 of ASTM D 1998-91?	☒	☐	☐
19a. Are test specimens cut from a manway, fitting, or other representative area?	☒	☐	☐
19b. Are specimens tested in a suitable apparatus with inside surface down and impacted with a dart of specified weight, height, and tip radius?	☒	☐	☐
19c. If the standard specimen size (5 in. by 5 in. or 127 mm by 127 mm) was not used, does supplier show correlation data between the actual size and the standard?	☐	☐	☒
19d. Does the test report include the following?:			
- Identification of the tank.	☒	☐	☐
- Date of test.	☒	☐	☐
- Foot-pounds used for test.	☒	☐	☐
- Pass or fail.	☒	☐	☐
19e. Have precision and bias been determined in accordance with Section 11.3.6.1 of ASTM D 1998-91?	☐	☒	☐

	Yes	No	N/A
20. Is the manufacturer equipped to perform the Gel Test in accordance with Section 11.4 of ASTM D 1998-91?	☒	☐	☐
20a. Are the test specimens taken from a manway, fitting, or other representative area which is normally removed from the tank before use?	☒	☐	☐
20b. Is the ASTM D 1998-91 test procedure in Section 11.4.7 and equation in Section 11.4.8 used?	☒	☐	☐
20c. Do test reports include the following?:			
- Identification of the tank.	☒	☐	☐
- Date of test.	☒	☐	☐
- Percentage of Gel calculated.	☒	☐	☐
- Precision and bias.	☐	☒	☐
20d. Is a 60% minimum gel level inside of the wall used to determine pass/fail?	☒	☐	☐
21. Is the manufacturer equipped to hydrostatically test tanks in accordance with Section 11.6 ASTM D 1998-91?	☒	☐	☐
21a. Are the tanks hydrostatically tested with the proper final fittings?	☒	☐	☐
21b. Do test reports include the following?:			
- identification of the tank	☒	☐	☐
- duration of the test	☒	☐	☐
- observance of leakage	☒	☐	☐
22. Are the size, location and specification for man-ways and fittings correct?	☒	☐	☐
23. Do calculations performed to determine vent size comply with OSHA 1910.106 (or other accepted standard) for normal venting of atmospheric tanks?	☒	☐	☐
23a. If not, are vents at least as large as the fitting or withdrawal connection, whichever is larger, but not less than 1.0 inch nominal inside diameter?	☒	☐	☐
24. Are plastic fittings designed in accordance with ASTM D 1998-91?	☒	☐	☐
25. Are plastic fittings made of Schedule 80, Type I, Grade I polyvinyl chloride (PVC) and pipe grade polyethylene?	☒	☐	☐
26. Are the tank fittings located in areas of extra thickness for added rigidity and structural integrity?	☒	☐	☐
27. Is the fill assembly designed to withstand hydrodynamic loadings and does it minimize the possibility of splashing on the underside of the closed tank top?	☒	☐	☐
28. Are all components contacting the tanks designed of compatible materials?	☒	☐	☐
29. Will PVC joints be solvent welded in accordance with ASTM D 2855?	☒	☐	☐
30. Are metal components designed to be A36 mild steel unless otherwise specified?	☐	☐	☒
31. Are gaskets designed to be Ethylene Propylene Diene Monomers (EPDM)?	☐	☐	☒

	Yes	No	N/A
32. Is a leak detection system designed?	☒	☐	☐
33. Are provisions made to ensure hydraulic communication between the primary tank bottom and the leak detection device(s) under fully loaded conditions?	☐	☐	☒
34. Is the sensor designed to be located at or near the bottom of the secondary tank so any leakage from the primary tank would be detected as early as practicable?	☐	☐	☒
35. Is the tank leak detection system self-contained, battery powered, and have a flashing light to signify a detected leak?	☐	☐	☒
36. Does the sensor have a low voltage battery indicator?	☐	☐	☒
37. Is the detection system capable of remaining in alarm mode (light flashing) for a minimum of 48 hours and is the alarm light enclosure rated NEMA 4X?	☐	☐	☒
38. Are the tents going to be heated?	☐	☒	☐
38a. If no, were the tanks designed to compensate for freeze and thaw?	☒	☐	☐

WASTE CHARACTERIZATION

1. Is all the appropriate and necessary characterization data of the chemicals and concentrations in the sludge and pond water available?	☒	☐	☐
1a. Is specific gravity defined?	☒	☐	☐
1b. Are the waste settling properties defined?	☒	☐	☐
1c. Is the chemical composition defined?	☒	☐	☐
1d. Are the radioactive properties of the waste defined?	☒	☐	☐
1e. Is the pH of the waste defined?	☒	☐	☐
2. Is the volume of waste from each of the solar ponds available?	☒	☐	☐
3. Has an assessment of the corrosion resistance of high density cross linked polyethylene (HDXLPE) to the solar pond water and sludge been performed?	☒	☐	☐
4. Has a determination been correctly made that the inorganic compounds present in the pond water or sludge are compatible with the HDXLPE material?	☒	☐	☐
5. Has a determination been correctly made that the organic compounds present in the pond water or sludge are compatible with the HDXLPE material?	☒	☐	☐
6. Were calculations correctly performed to determine the effect on the strength of the tank due to absorption of the active organic compounds?	☒	☐	☐
7. Were Total Organic Carbon (TOC) concentrations accounted for in determining the shell wall thickness of the tank?	☐	☒	☐

	Yes	No	N/A
8. Has a determination been correctly made that the radiological compounds present in the pond water or sludge are compatible with the HDXLPE material?	☒	☐	☐
9. Based on the waste characterization data and the chemical-resistance properties of the polyethylene material, are the ASRP tanks compatible with the wastes to be stored in them?	☑	☐	☐
10. Are the fabricated nozzles, gaskets, and other fitting accessories chemically compatible with the materials to be handled in the tanks?	☒	☐	☐
11. Are the bolts securing mechanical fittings manufactured of materials compatible with tank contents?	☒	☐	☐
12. Does the specific gravity used for the structural design meet or exceed the specific gravity of the waste? possible 1.995 (analytical data)	☐	☒	☐

Comments: _____

_____

_____

_____

_____

ERM

Project ASRP Tank Assessment MTS 350370A3 Proj. No. R31206.0 Task 1 Sheet 1 of 1

Subject Hydrostatic Design Stress Calculation By Pamela J. Mitchell Date 12/22/93

Support to Information Review Checklist, No. 14a Checked by E GRAHAM Date 1/11/93

Intent: Calculate hydrostatic design stress based on hoop stress test results

Methodology: obtain input data from available documents

Equation Reference: ASTM 1998-91, Section 6.1.1 (Safety Factor)

Assumptions and Input data:

Ref 1 provides hydrostatic design basis (HDB) = 1250 psi

Calculation:

SD = Maximum recommended hydrostatic design stress (psi)

SD = HDB x SF

SF = 0.475 (for wall thickness above 0.375 inches) (Ref 2)

SD = 1250 (0.475)

= 593.75 psi

Ref. 1 - letter from Edward F Kozlowski to Joseph Joshi, Sept 30, 1993.

Ref. 2 - ASTM-1598-91, Section 6.1.1

ERM

Project: ASRP Tank Assessment MTS 350370 PA 3	Proj. No. R 31206.0 Task 1	Sheet 1 of 2
Subject: Wall Thickness Calculation	By: Pamela J. Mitchell, P.E.	Date: 12/22/93
Support to Information Review Checklist, No. 13	Checked by: E. GRAHAM	Date: 1/13/94

Intent: Calculate required wall thickness for primary tank and containment tank using Barlow formula.

Methodology: obtain input data from available documents

Equation Reference: ASTM 1998-91, Section 6.1. $T = \frac{0.433 \times S.G. \times H \times O.D.}{2\,SD}$

Assumptions and Input Data:

S.G = SPECIFIC GRAVITY = 1.9

H = fluid head in tank (ft) = PRIMARY TANK = 10 ft; CONTAINMENT = 11 ft.

O.D. = outside tank diameter (in)
= 160 in (primary)
= 165 in (containment)

S.D. = hydrostatic design stress (psi) = 593 psi (see Hydrostatic Design Stress calculation)

Note: THIS NUMBER IS REDUCED FOR CALCULATIONS AT THE FILL LINE TO ACCOUNT FOR THE POTENTIAL ABSORPTION OF TOTAL ORGANIC COMPOUNDS (TOC) RESULTING IN A 10% REDUCTION IN TENSILE STRENGTH. (REF 1) ∴ S.D = (.9)(593) = 534 psi

Calculations:

T = WALL THICKNESS (in.)

$$T = \frac{0.433 \times S.G. \times H\,(ft) \times O.D.\,(in)}{2\,S.D.\,(psi)}$$

PRIMARY:

$T = 0.433(1.9)\,H(160)/[2(593)]$

$T = 0.111\,H$

PRIMARY (AT FILL LINE):

$T_{FILL\ LINE} = 0.433(1.9)\,H(160)/[2(534)]$

$= 0.123\,H$

CONTAINMENT:

$T = 0.433(1.9)\,H(165)/[2(593)]$

$T = 0.114\,H$

CONTAINMENT (AT FILL LINE):

$T_{FILL\ LINE} = 0.433(1.9)\,H(165)/[2(534)]$

$= 0.127\,H$

Ref. 1 – Section 6.6.3 · Corrosion Report · Interoffice Memorandum, 15 Sept 1993 from R.G. Bonny and H.H. Baker to J.H. Templeton. Corrosion Evaluation of Polyethylene Containers for Storage of Pond "C" Water and Sludge.

ERM

Project ASRP TANK ASSESSMENT MTS 750370 PA3 | Proj. No. R31206.0 TASK 1 | Sheet 2 of 2

Subject WALL THICKNESS CALCULATION | By E. GRAHAM | Date 1/13/94

SUPPORT TO INFORMATION REVIEW CHECKLIST, No. 13 | Checked by PJ Mitchell | Date 1/13/94

CALCULATIONS (CONTINUED): PRIMARY TANK

STRAIGHT SIDEWALL HEIGHT	ASTM CALCULATED WALL THICKNESS	ASTM CALCULATION	— 20% ASTM DESIGN THICKNESS
H	T	$= 0.433(1.9)\,H(160)/[2(593)]$	
		$= 0.111\,H$	

NOTE: AN ADJUSTMENT IN THE HYDROSTATIC DESIGN STRESS AT THE FILL LINE MUST BE MADE TO ACCOUNT FOR THE POTENTIAL ABSORPTION OF TOCs RESULTING IN A REDUCTION IN TENSILE STRENGTH OF 10%.

$* T_{FILL\ LINE} = 0.433(1.9)\,H(160)/(2[(.9)(593)])$

$= 0.123H$

H	T		
			0.187
* 1	0.187	(MINIMUM ASTM THICKNESS ALLOWED)	0.157
2	0.222		0.266
3	0.333		0.355
4	0.444		0.444
5	0.555		0.533
6	0.666		0.622
7	0.777		0.710
8	0.835		0.799
9	0.999		0.888
10	1.110		

CONTAINMENT TANK

$= (0.433)(1.9)\,H(165)/[2(593)]$

$= 0.114\,H$

$* T_{FILL\ LINE} = (0.433)(1.9)\,H(165)/(2[(.9)(593)])$

$= 0.127\,H$

H	T		
* 1	0.187	(MINIMUM ASTM THICKNESS ALLOWED)	0.187
2	0.228		0.187
3	0.342		0.274
4	0.456		0.365
5	0.570		0.456
6	0.684		0.547
7	0.798		0.638
8	0.912		0.730
9	1.026		0.821
10	1.140		0.912
11	1.254		1.003

APPENDIX C

SHIPPING/DELIVERY/INSTALLATION OVERSIGHT CHECKLISTS

SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: M. Keller, R. Hea
Date: 12/16/93, 1-7-94

RCRA No. 25.006
RFP Tank No. D-6
Primary Tank Serial No. C93-03053
Secondary Tank Serial No. C93-03046
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☐	☒	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted?	☐	☐	☒
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☐	☒	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking	☒	☐	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

Overfill pipe broken

overfill float tube repaired & inspected 1/7/94

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? Superficial scrapes.	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 1/6/94	☒	☐	☐
17. Are proper warning signs affixed to the tank? Confined Space, RCRA & RFP Tank #5	☒	☐	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detector)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment?	☒	☐	☐
a. Is the space adequate to implement waste removal strategies?	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? Per shipping bill, cant visually verify	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? Per design spec, cant visually verify	☒	☐	☐

Comments: Overfill float tube repaired & inspected on 1/7/94

Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-03053	Checked By		Date	
Date Shipped	12/13/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-31°F	12/10/93
Gel Test (> 65%)	P	71.6%	12/9/93
Wall Thickness Test	F		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	30 minutes	12/11/93

Comments: The data collected at 270 degrees and 1 ft. from the bottom of the tank was equal to 0.991 inches. This value is below the ASTM calculated value of 0.999 not including the 20% tolerance. Since the area involved is unknown but potentially greater than 1 sq. ft. (ASTM D 1998-91) the tank cannot be filled to a height of 10 ft. and hold materials having a specific gravity of 1.9.

Maximum Allowable Fill Height @ S.G.=1.9	7 ft.*
Maximum Allowable S.G. @ Fill Height=10ft.	1.88

* If more data points were taken, the allowable fill height could be much closer to the original 10 ft. value.

ZORB TANKS

POLY CAL PLASTICS

A Division of Abell Corporation

WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	PCP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	1.025	1.003	1.001	.991
3	0.78	0.62	1.191	.945	.987	.961
5	0.56	0.45	.640	.981	1.051	1.000
7	0.50	0.40	.711	.653	.652	.648
9	0.50	0.40	.506	.501	.568	.632

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.493
4	0.50	0.38	.501
6	0.50	0.38	.713
8	0.50	0.38	.743
10	0.50	0.38	.499
12	0.50	0.38	.503

MHL 11/4/93

Revised 11/22/93

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TELEFAX NO. (209) 982-0455

SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: R. Hea / M. Keller
Date: 12/14/93
1/7/94
RCA 1/7/94

RCRA No. 25.007
RFP Tank No. D-7
Primary Tank Serial No. C93-02899
Secondary Tank Serial No. C93-02961
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☐	☒	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted? overfill float tube broken - fixed & checked 1/7/94 RCA 1/7/94	☒	☐	☐
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking	☒	☐	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? Superficial scrapes & scratches	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 12/30/93	☒	☐	☐
17. Are proper warning signs affixed to the tank? Confined space, tank & RCRA #s stenciled on	☒	☐	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detection system)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment? Spacing is tight ~1 inch on low side but can	☒	☐	☐
a. Is the space adequate to implement waste removal strategies? See adjacent to it. Additional spacing blocks to be inserted between primary & secondary to improve spacing	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? per shipping bill, can't visually verify	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? per design spec, can't visually verify	☒	☐	☐

Comments: Overfill float tube repaired & checked on 1/7/94

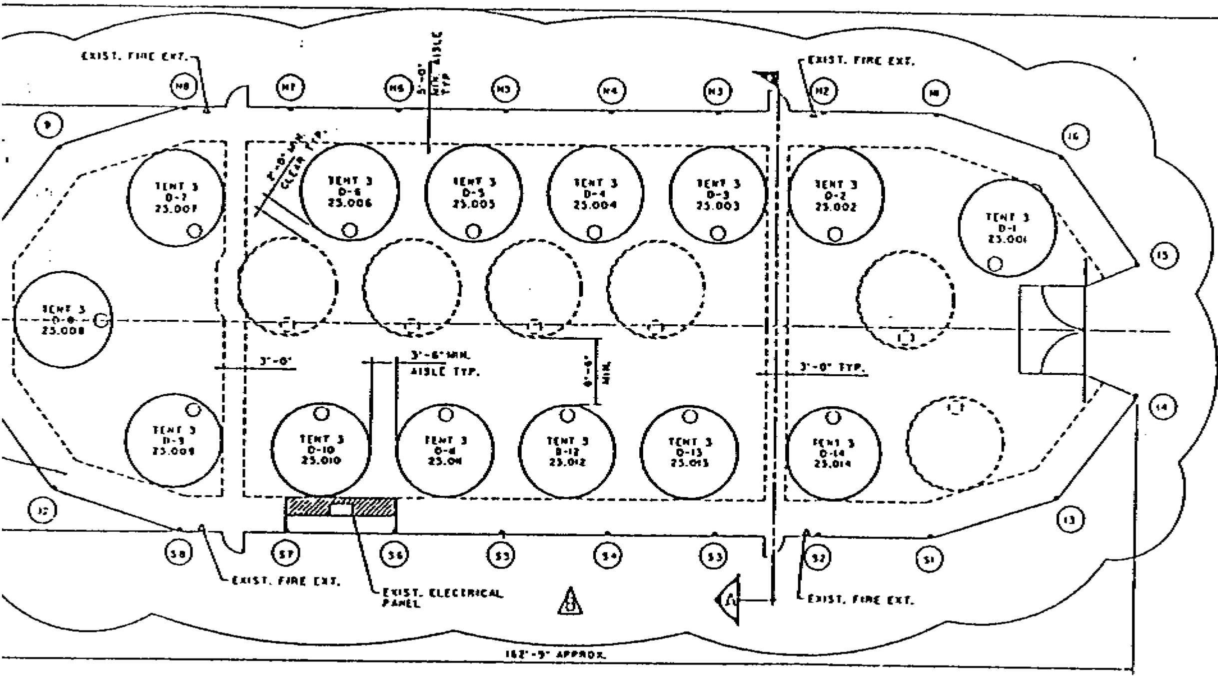
Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-02899	Checked By		Date	
Date Shipped	12/8/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-37°F	12/2/93
Gel Test (> 65%)	P	72.3%	11/26/93
Wall Thickness Test	F		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	35 minutes	12/3/93

Comments: The data collected at 0 and 180 degrees at 1 ft. from the bottom of the tank was equal to 0.924 in. and 0.972 respectively. These values are below the ASTM calculated value of 0.999 not including the 20% tolerance. Since the area involved is unknown but potentially greater than 1 sq. ft. (ASTM D 1998-91) the tank cannot be filled to a height of 10 ft. and hold materials having a specific gravity of 1.9.

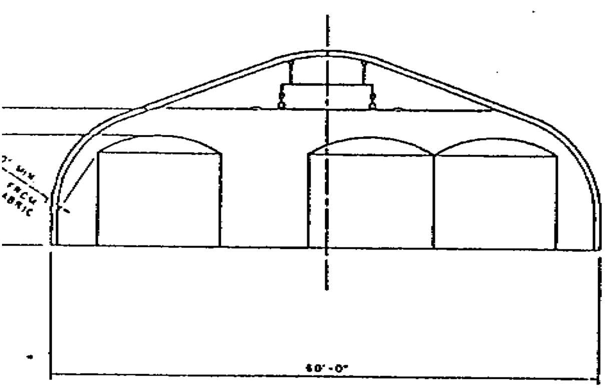
Maximum Allowable Fill Height @ S.G.=1.9	7 ft.*
Maximum Allowable S.G. @ Fill Height=10ft.	1.76

* If more data points were taken, the allowable fill height could be much closer to the original 10 ft. value.



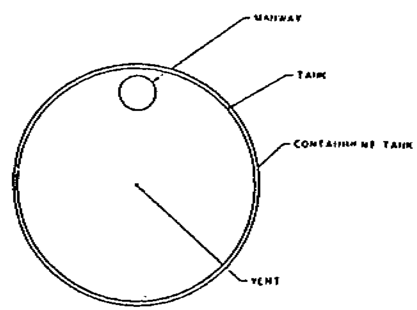
TENT 3

SCALE: 1" = 10'-0"



SECTION A

SCALE: 1/8" = 1'-0"



TANK DETAIL

SCALE: 1/4" = 1'-0"

NOTES:

1. REMOVE CONCRETE BARRIER IN FRONT OF EXISTING ELECTRICAL PANEL BETWEEN COLUMNS S6 & S7.
2. THE ERECTION SUBCONTRACTOR SHALL DETERMINE TANK PLACEMENT MAINTAINING ALL MINIMUM AISLE AND TENT CLEARANCES AS SHOWN ON DRAWINGS.
3. TANKS SHALL NOT BE PLACED ON EXISTING CONCRETE PADS IN FLOOR.
4. MAINTAIN 1'-0" CLEAR BETWEEN THE TANK AND TENT FABRIC.
5. AFTER INSTALLATION, PAINT EGRESS AISLES ON FLOOR. AISLE LINES SHALL BE 3" WIDE PAINTED FEDERAL SAFETY YELLOW. REMOVE ALL EXISTING EGRESS LINES WHICH CONFLICT WITH NEW EGRESS ROUTES.
6. SEE DRAWING 51006-401 FOR VENT PIPING.
7. SEE DRAWING 51006-750 THRU 756 FOR LEAK DETECTION SYSTEM.
8. THE LOCATION OF EACH TANK ON THE 750 PAD SHALL BE MARKED WITH YELLOW PAINT PRIOR TO PLACEMENT. THE MARK SHALL INDICATE THE OUTSIDE DIAMETER OF THE SECONDARY CONTAINMENT TANK. A MEMBER OF STRUCTURAL ENGINEERING SHALL CHECK EACH LOCATION FOR SMOOTHNESS PRIOR TO PLACING THE TANK. REPAIR OF THE SURFACE, IF REQUIRED, SHALL BE PER THE STRUCTURAL ENGINEERS REQUIREMENT.

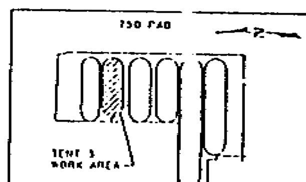
LEGEND

TANK TO BE INSTALLED AT A LATER DATE

PLANT STD. TANK LABEL

RCRA NUMBER

TANK RCRA NUMBER	PRIMARY TANK SERIAL NUMBER	SECONDARY TANK SERIAL NUMBER
25.001	C93-03432	C93-03370
25.002	C93-02950	C93-03374
25.003	C93-03315	C93-02940
25.004	C93-03354	C93-03348
25.005	C93-03345	C93-03304
25.006	C93-03033	C93-03046
25.007	C93-02859	C93-02961
25.008	C93-02881	C93-02935
25.009	C93-02967	C93-02979
25.010	C93-02939	C93-03058
25.011	C93-03333	C93-03312
25.012	C93-03102	C93-03338
25.013	C93-03091	C93-03095
25.014	C93-03072	C93-0[illegible]



KEY PLAN

SCALE: NONE

KEYWORDS
1. ACCELERATED
2. SLUDGE
3. REMOVAL
4. PROJECT
5.
750 PAD
TENT 3

B CURRENT STATUS AS OF 1-4-94

A ORIGINAL ISSUE 8-17-93

U.S. DEPARTMENT OF ENERGY

Rocky Flats Plant

GOLDEN, COLORADO

ACCELERATED SLUDGE REMOVAL PROJECT

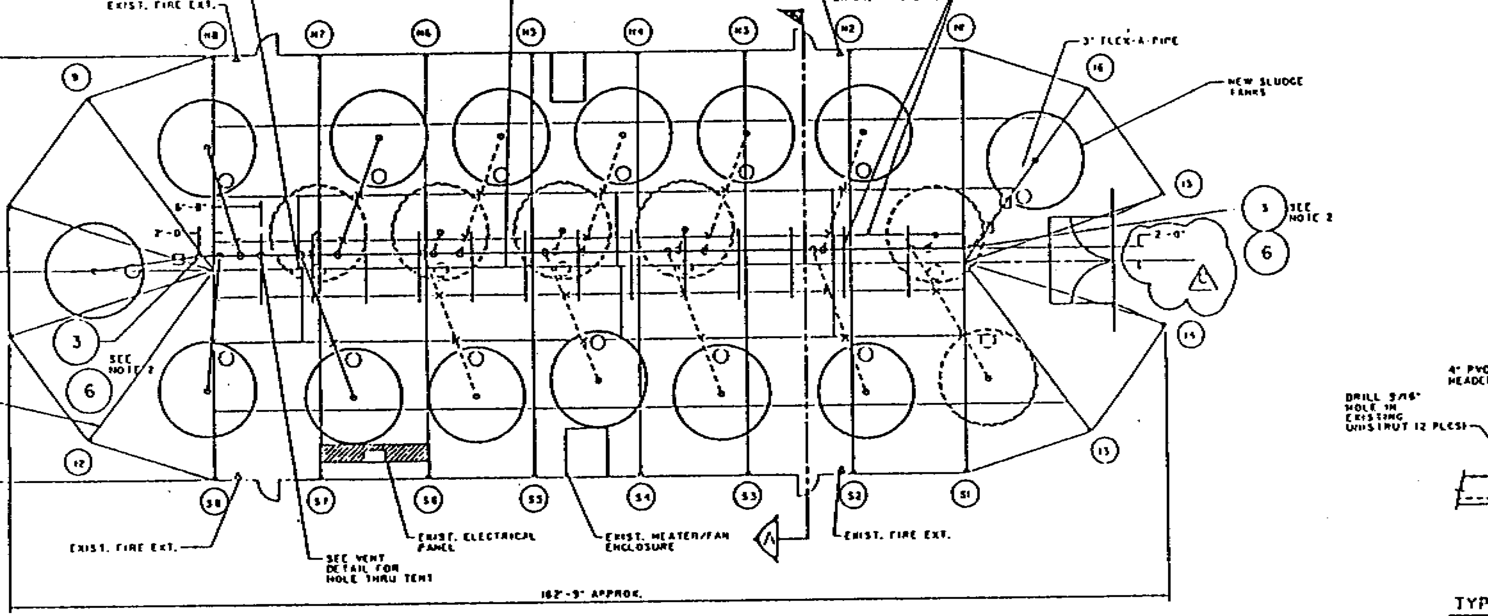
TANK INSTALLATION PLAN & SECTION TENT 3

SCALE: AS NOTED

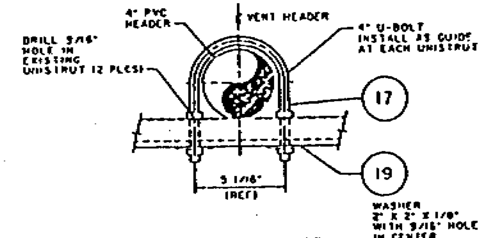
D 51006-200 B

COMPUTER GENERATED

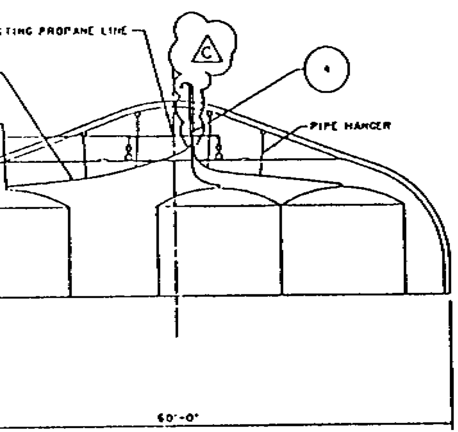
3	4	4" 90° ELL, SCH 40	
4	18	4" X 4" X 3" RTEE, SCH 40	PVC
5	20	3" 90° STREET ELL, SCH 40	PVC
6	2	4" X 3" RED. BUSHING	PVC
7	3	1/4-20 1" LG BOLT & UNISTRUT NUT PN/1005T1470	C.S.
8	72	3" SPLIT RING PIPE CLAMP "GRINNELL" FIG 104	C.S.
9	800'	1/8" GALVANIZED STEEL CABLE MCMASTER-CARR PN/3450T32	
10	200	1/8" COMPRESSION SLEEVE MCMASTER-CARR PN/3727T14	
11	1'	1" X 1" X 1" LG -3/16" ANGLE	C.S.
12	100	1/4"-14 1" LG HWH HILTI KWIK PRO SELF-DRILLING SCREW	C.S.
13	12	1/4"-20 X 1" LG BOLT & NUT	C.S.
14	15'	1 1/4" X 1 1/4" X 3/16" ANGLE	C.S.
15	6	4" PIPE CLAMP "GRINNELL" FIG 212	C.S.
16	3	6" DIA 1'-0" LNG SLEEVE WITH 3" GUSSET (CANVAS SPECIALTY)	
17	75	4" U-BOLT "GRINNELL" FIG 137	C.S.
18	1	4" TEE, SCH 40	PVC
19	150	2" X 2" X 1/8" WASHER	C.S.
20	3	4" HOSE CLAMPS	SS
21	3	1" X 1" FABRIC FLANGE (CANVAS SPECIALTY)	
22	A/R	PVC SOLVENT CEMENT PER ASTM D2564	



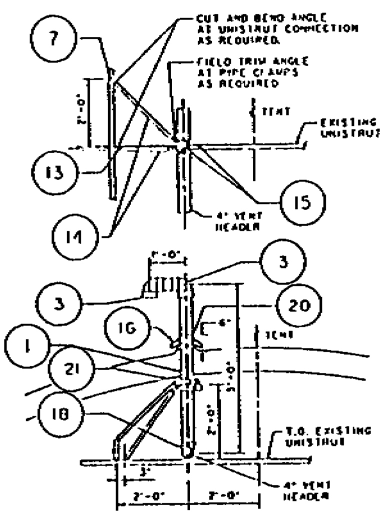
TENT 3
SCALE: 1" = 10'-0"



TYPICAL GUIDE DETAIL
SCALE: NONE

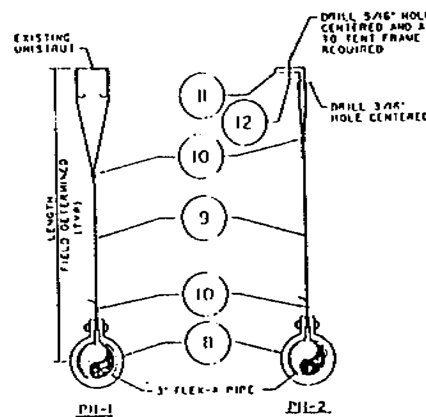


SECTION A
SCALE: 1/8" = 1'-0"



VENT & SUPPORT DETAIL
SCALE: 1/2" = 1'-0"

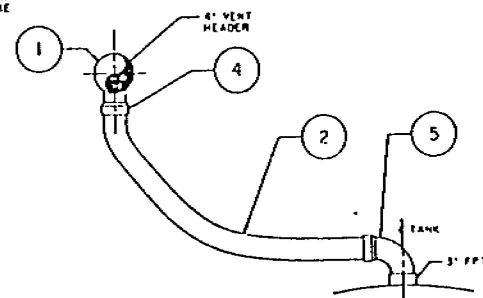
DETAIL AS SHOWN FOR TENTS 4 & 6. FOR TENT 3, MAKE ANGLE SUPPORTS OPPOSITE HAND.



HANGER DETAIL
SCALE: NONE

HANGER LEGEND
X = PH-1 (TYP 26)
[] = PH-2 (TYP 3)

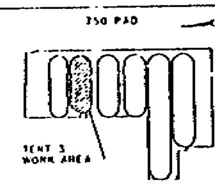
TANK LEGEND
TANKS AND FLEX-A-PIPE TO BE INSTALLED AT LATER DATE.



TYPICAL TANK TO HEADER CONNECTION
SCALE: NONE

...SUCH MANNER THAT LINES
...G AT EACH END
...GIVEN ARE APPROXIMATE.
...DER.
...AVAILABLE.
...NOT AVAILABLE
...NT CLVENTED

6. CANVAS SLEEVE WITH 3" GUSSET ON OUTER WALL AND REINFORCING FABRIC FLANGE ON INTER WALL TO BE INSTALLED USING HOTAIR WELDER (ALL AREAS TO BE CLEANED WITH MEK BEFORE BEING WELDED)



KEY PLAN
SCALE: NONE

KEYWORDS
1. ACCELERATED
2. SLUDGE
3. REMOVAL
4. PROJECT

750 PAD
TENT 3

C	CURRENT STATUS AS OF 1-5-94	1-5-94	
B	CHANGED 3" FLEX PIPE & FITTINGS	12-7-93	
A	ORIGINAL ISSUE	8-30-93	

U.S. DEPARTMENT OF ENERGY
ROCKY FLATS OFFICE — GOLDEN, COLORADO
Rocky Flats Plant
GOLDEN, COLORADO
ACCELERATED SLUDGE REMOVAL PROJECT
TANK VENTING PLAN, SECTION & DETAIL TENT 3

SCALE: AS NOTED
D 51006-401 C

COMPUTER GENERATED — NO MANUAL CHANGES ALLOWED
P.P.51006-401 C SEF.TENT3

WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	PCP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	.924	1.174	.972	1.171
3	0.78	0.62	.948	.985	1.058	1.312
5	0.56	0.45	.826	.904	.896	.885
7	0.50	0.40	.618	.756	.704	.777
9	0.50	0.40	.684	.775	.748	.695

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.611
4	0.50	0.38	.750
6	0.50	0.38	.776
8	0.50	0.38	.980
10	0.50	0.38	.829
12	0.50	0.38	.835

MHL 11/4/93

Revised 11/22/93

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SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: R.Hea / M. Keller
Date: 12/14/93
1/7/94
ECA 11704

RCRA No. 25.008
RFP Tank No. D-8
Primary Tank Serial No. C93-02881
Secondary Tank Serial No. C93-02895
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☐	☒	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted?	☒	☐	☐
Overfill float tube broken - fixed & checked 1/7/94 ECA 1/7/94			
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking	☒	☐	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? superficial scrapes & scratches	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 12/29/93	☒	☐	☐
17. Are proper warning signs affixed to the tank? confined space, toxic & RCRA # stenciled	☒	☐	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detection system)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment?	☒	☐	☐
a. Is the space adequate to implement waste removal strategies?	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? According to Shipping bill - cont visually verify	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? per design spec, cont visually verify	☒	☐	☐

Comments: overfill float tube repaired & checked on 1/7/94

Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-02881	Checked By		Date	
Date Shipped	12/8/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-41°F	12/3/93
Gel Test (> 65%)	P	75.9%	12/2/93
Wall Thickness Test	F		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	35 minutes	12/7/93

Comments: The data collected at 270 degrees and 1 ft. from the bottom of the tank was equal to 0.893 inches. This value is below the ASTM calculated value of 0.999 not including the 20% tolerance. Since the area involved is unknown but potentially greater than 1 sq. ft. (ASTM D 1998-91) the tank cannot be filled to a height of 10 ft. and hold materials having a specific gravity of 1.9.

Maximum Allowable Fill Height @ S.G.=1.9	7 ft.*
Maximum Allowable S.G. @ Fill Height=10ft.	1.70

* If more data points were taken, the allowable fill height could be much closer to the original 10 ft. value.

WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	POP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	1.004	1.002	1.015	.893
3	0.78	0.62	1.207	1.129	.817	.984
5	0.56	0.45	.682	.919	.950	1.058
7	0.50	0.40	.729	1.078	.736	1.001
9	0.50	0.40	.595	.897	.783	.610

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.667
4	0.50	0.38	.704
6	0.50	0.38	.904
8	0.50	0.38	.828
10	0.50	0.38	.737
12	0.50	0.38	.520

MHL 11/4/93

Revised 11/22/93

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SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: M. Keller R. Hea
Date: 12/16/93, 1/7/94

RCRA No. 25.009
RFP Tank No. D-9
Primary Tank Serial No. C93-02967
Secondary Tank Serial No. C93-02929
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☒	☐	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted?	☐	☐	☒
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking	☒	☐	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? Superficial Scrapes	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 1/5/94	☒	☐	☐
17. Are proper warning signs affixed to the tank? Confined Space, tank ERCRA #5 stenciled on	☒	☐	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detection system)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment?	☒	☐	☐
a. Is the space adequate to implement waste removal strategies?	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? Per shipping bill, cant be visually verified	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? Per design spec, cant visually verify	☒	☐	☐

Comments:_____

_____

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_____

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Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-02967	Checked By		Date	
Date Shipped	12/13/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-33°F	12/9/93
Gel Test (> 65%)	P	75.2%	12/8/93
Wall Thickness Test	F		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	33 minutes	12/8/93

Comments: The data collected at 180 degrees and 1 ft. from the bottom of the tank was equal to 0.944 inches. This value is below the ASTM calculated value of 0.999 not including the 20% tolerance. Since the area involved is unknown but potentially greater than 1 sq. ft. (ASTM D 1998-91) the tank cannot be filled to a height of 10 ft. and hold materials having a specific gravity of 1.9.

Maximum Allowable Fill Height @ S.G.=1.9	7 ft.*
Maximum Allowable S.G. @ Fill Height=10ft.	1.80

* If more data points were taken, the allowable fill height could be much closer to the original 10 ft. value.

02767

ZORB TANKS

POLY CAL PLASTICS

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WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	PCP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	1.049	1.057	.944	1.159
3	0.78	0.62	.939	1.231	1.119	1.051
5	0.56	0.45	.705	1.064	.871	.866
7	0.50	0.40	.588	.652	.617	.885
9	0.50	0.40	.624	.708	.724	.793

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.681
4	0.50	0.38	.699
6	0.50	0.38	.942
8	0.50	0.38	.790
10	0.50	0.38	.710
12	0.50	0.38	.592

MHL 11/4/93

Revised 11/22/93

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SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: M. Keller R. Hea
Date: 12/16/93, 1/7/94

RCRA No. 25-010
RFP Tank No. D-10
Primary Tank Serial No. C93-02939 ? corr'd ✓ RCH 1/7/94
Secondary Tank Serial No. C93-03058
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☒	☐	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted?	☐	☐	☒
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity Wrong Capacity on tank 12,025 vs 11,150	☐	☒	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking	☐	☒	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? Superficial Scrapes	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 1/3/94	☒	☐	☐
17. Are proper warning signs affixed to the tank? has RCRA & RFP tank #s, missing confined space entry sign	☐	☒	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detector)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment?	☒	☐	☐
a. Is the space adequate to implement waste removal strategies?	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? Per shipping bill, can't visually verify	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? Per design spec, can't visually verify	☒	☐	☐

Comments: _____

Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-02939	Checked By		Date	
Date Shipped	12/13/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-32°F	12/9/93
Gel Test (> 65%)	P	71.5%	12/3/93
Wall Thickness Test	F		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	35 minutes	12/9/93

Comments: The data collected at 0 degrees and 1 ft. from the bottom of the tank was equal to 0.998 inches. This value is below the ASTM calculated value of 0.999 not including the 20% tolerance. Since the area involved is unknown but potentially greater than 1 sq. ft. (ASTM D 1998-91) the tank cannot be filled to a height of 10 ft. and hold materials having a specific gravity of 1.9.

Maximum Allowable Fill Height @ S.G.=1.9	7 ft.*
Maximum Allowable S.G. @ Fill Height=10ft.	1.898

* If more data points were taken, the allowable fill height could be much closer to the original 10 ft. value.

ZORB TANKS

POLY CAL PLASTICS

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WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	PCP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	.998	1.094	.999	1.181
3	0.78	0.62	.932	.927	1.244	874
5	0.56	0.45	.641	1.087	.987	.821
7	0.50	0.40	.755	.625	.589	.779
9	0.50	0.40	.872	.790	.569	.824

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.748
4	0.50	0.38	757
6	0.50	0.38	.909
8	0.50	0.38	.701
10	0.50	0.38	.665
12	0.50	0.38	.650

MHL 11/4/93

Revised 11/22/93

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SHIPPING/DELIVERY/INSTALLATION OVERSIGHT FORM

ASRP RCRA TANK ASSESSMENT
ROCKY FLATS PLANT
MTS 350370PA3

Inspector: M Keller R. Hea
Date: 12/23/93, 1/7/94

RCRA No. 25.011
RFP Tank No. D-11
Primary Tank Serial No. C95-03553
Secondary Tank Serial No. C95-03512
Tent No. 3

	Yes	No	N/A
1. Were manufacturer's instructions for off-loading, and placement provided prior to shipment?	☒	☐	☐
2. Were manufacturer's QC travelers supplied with each polyethylene tank (Tank information/test data for both the primary and secondary tanks)?	☒	☐	☐
3. Were all manufacturer-specified requirements for shipping followed?	☒	☐	☐
a. Was the primary tank nested inside the secondary tank for shipment?	☒	☐	☐
b. Were the tanks covered to prevent debris contamination?	☒	☐	☐
c. Were tanks positively vented during transport?	☒	☐	☐
d. Were all fittings and flange faces protected from damage during transport?	☒	☐	☐
e. Were loose items protectively packed separately and not left inside tanks where damage to tank may have resulted?	☒	☐	☐
4. Were manufacturer's instructions for off-loading followed?	☒	☐	☐
a. Was offloading completed without mishap?	☒	☐	☐
5. Are the primary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☐	☒	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐
g. confined space entry marking — Not Applicable Visible	☐	☒	☐
6. Are the secondary tanks permanently marked with the following?			
a. manufacturer	☒	☐	☐
b. date manufactured (month and year)	☒	☐	☐
c. capacity	☒	☐	☐
d. maximum specific gravity of tank design	☒	☐	☐
e. serial number	☒	☐	☐
f. Type I	☒	☐	☐

	Yes	No	N/A
7. Are the outer surfaces of the secondary tank free of signs of damage (weld breaks, punctures, cracks, corrosion and other structural damage)? Slight mild scaling	☒	☐	☐
8. If the secondary tank was damaged, was the primary tank inspected for damage?	☐	☐	☒
9. Is one fill assembly provided per primary tank and located in the man-way?	☒	☐	☐
10. Is the fill assembly constructed of schedule 80 PVC and installed properly?	☒	☐	☐
11. Are all edges, where openings are cut into the tanks, trimmed smooth?	☒	☐	☐
12. Is the asphalt surface level?	☒	☐	☐
a. If no, was sand or padding used to provide an even surface on the asphalt for tank placement?	☐	☐	☒
13. Was the existing asphalt surface permanently marked to indicate the proposed location of all tanks?	☒	☐	☐
14. Were manufacturer's instructions for assembly and placement followed without mishap?	☒	☐	☐
15. Following installation is the secondary tank free of weld breaks, punctures, cracks, corrosion and other structural damage?	☒	☐	☐
16. Was a hydrostatic test conducted at the time of installation by filling the tank completely with water and checking for leaks? Accepted 1/7/94	☒	☐	☐
17. Are proper warning signs affixed to the tank? Has RCRA & RFD tank #s, confined space entry sign not visible	☐	☒	☐
18. Is ancillary equipment supported and protected against physical damage and stress due to settlement, vibration, expansion and contraction?	☒	☐	☐
19. Is leak detection equipment installed (near the bottom, between primary and secondary tanks) and operating properly?	☐	☒	☐
a. If no, will visual inspection of secondary containment be performed daily to detect leaks? (until installation of electronic leak detector)	☒	☐	☐
20. Were all fittings installed in accordance with design specifications?	☒	☐	☐
21. Is a 3-inch PVC Vent fitting placed in the center at the top of the primary tank and does it consist of a 3-inch National Pipe Thread (NPT) bulkhead fitting made of PVC?	☒	☐	☐
22. Is a vent system installed and operational?	☒	☐	☐
23. Are tanks permanently housed in tents constructed of a polyester substrate coated with polyvinyl chloride?	☒	☐	☐
24. Are spacers or equivalent installed between the primary and secondary tank?	☒	☐	☐

	Yes	No	N/A
25. Is the tank located at least one foot from the tent fabric?	☒	☐	☐
26. Does the space between the primary and secondary tank allow for visual inspection or the installation of leak detection equipment?	☒	☐	☐
a. Is the space adequate to implement waste removal strategies?	☒	☐	☐
27. Was a polyethylene mesh installed between the bottom surfaces of the primary and secondary tank to allow leak detection between tanks? Per shipping bill, can't visually verify	☒	☐	☐
28. Is the liquid level float assembly marked to indicate when the level is at the tangent line? Per design spec, can't visually verify	☒	☐	☐

Comments: _____

_____

_____

_____

_____

_____

Project	ASRP Tank Assess.	Proj. No.	R31206.0 Task 1	Sheet	1 o 1
Subject	Performance Data	By	E. Graham	Date	1/12/93
Serial No.	C93-03333	Checked By		Date	
Date Shipped	12/20/93				

Test	Pass/Fail	Specific Data	Date Completed
Impact Test (< -20°F)	P	-34°F	12/15/93
Gel Test (> 65%)	P	73.5%	12/20/93
Wall Thickness Test	P		
Cross-Linked Repairs	P	No repairs made	
Hydrotest (30 min. minimum)	P	35 minutes	12/15/93

Comments:

0.3333

ZORB TANKS

POLY CAL PLASTICS

A Division of Abell Corporation

WALL THICKNESS MEASUREMENTS

PRIMARY

FROM BOTTOM	PCP DESIGN	ASTM MINIMUM	ACTUALS 0°	90°	180°	270°
1	1.00	0.80	1.090	1.070	1.040	1.008
3	0.78	0.62	1.259	1.013	1.153	1.121
5	0.56	0.45	1.131	1.016	1.124	1.027
7	0.50	0.40	.718	.628	544	.679
9	0.50	0.40	.550	.599	.536	602

FLOOR THICKNESS

MEASURED FROM 0° ACROSS THE FLOOR TO 180°

FEET FROM EGDE	DESIGN	MINIMUM	ACTUALS
2	0.50	0.38	.521
4	0.50	0.38	.525
6	0.50	0.38	.533
8	0.50	0.38	.662
10	0.50	0.38	.601
12	0.50	0.38	.521

MHL 11/4/93

Revised 12/7/93

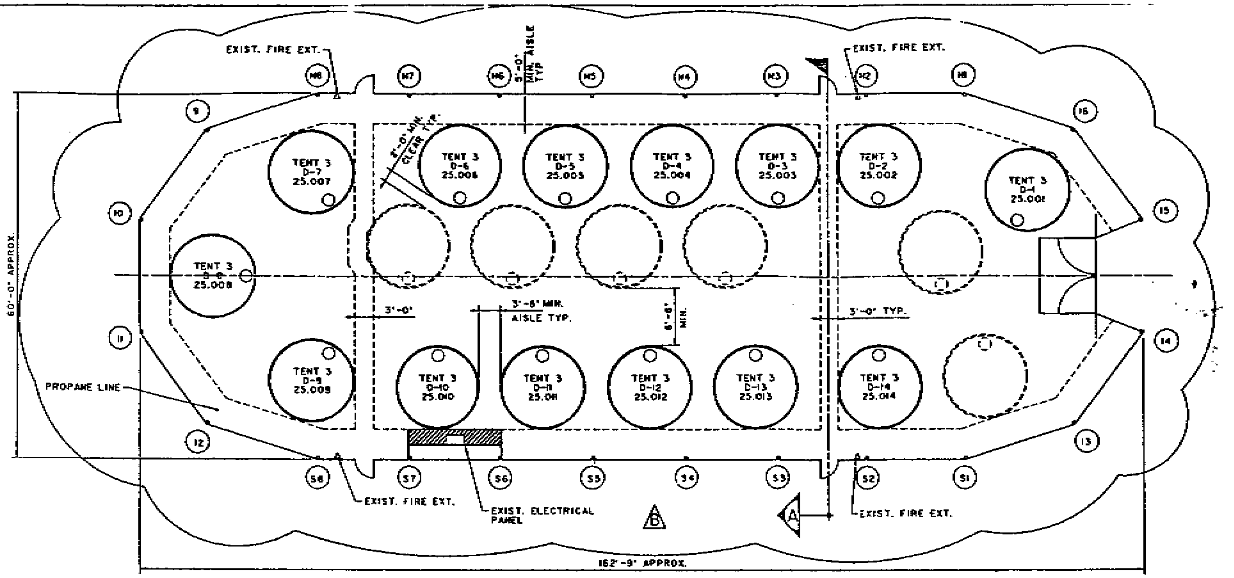
APPENDIX D

VERIFICATION OF COMPLETION OF HYDROSTATIC TESTING FOLLOWING INSTALLATION

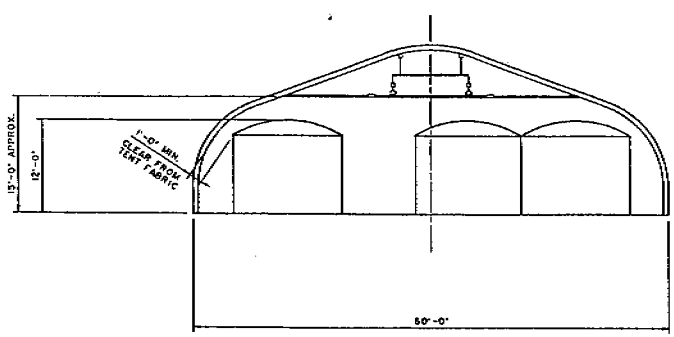
VERIFICATION OF COMPLETION OF HYDROSTATIC TESTING FOLLOWING INSTALLATION

EG&G completed hydrostatic testing following installation of the ASRP tanks listed below. A description of the testing procedure and documentation of the test results are included in the Rocky Flats Plant's Integrated Work Control Package (IWCP) TD073141, Rev. 0, titled "ASRP Tank Installation at the 750 Pad, Tents 3, 4 and 6." For each tank, the start and stop times of the test are recorded in the IWCP. The tank is checked for leaks by an inspector from EG&G's Facilities Inspection group, who documents the result in the IWCP. The following table provides the start and stop times and test results for each tank included in this certification package.

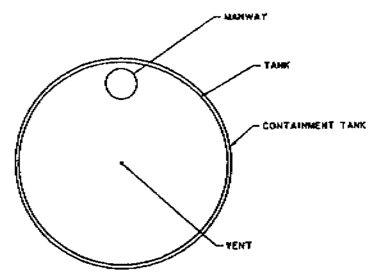
RCRA Unit No.	RFP Tank No.	Tent No.	Serial No.	Start		Stop		Test Result
				Date	Time	Date	Time	
25.006	D-6	3	C93-03053	01/05/94	14:50	01/06/94	14:50	Pass
25.007	D-7	3	C93-02899	12/29/93	10:30	12/30/93	10:30	Pass
25.008	D-8	3	C93-02881	12/28/93	14:00	12/29/93	14:00	Pass
25.009	D-9	3	C93-02967	01/04/94	12:55	01/05/94	12:55	Pass
25.010	D-10	3	C93-02939	12/31/93	10:00	01/03/94	10:00	Pass
25.011	D-11	3	C93-03333	01/06/94	12:10	01/07/94	12:50	Pass



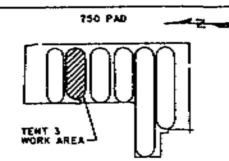
TENT 3
SCALE: 1" = 10'-0"



SECTION A
SCALE: 1/8" = 1'-0"



TANK DETAIL
SCALE: 1/4" = 1'-0"



KEY PLAN
SCALE: NONE

NOTES:

1. REMOVE CONCRETE BARRIER IN FRONT OF EXISTING ELECTRICAL PANEL BETWEEN COLUMNS S6 & S7.
2. THE ERECTION SUBCONTRACTOR SHALL DETERMINE TANK PLACEMENT, MAINTAINING ALL MINIMUM AISLE AND TENT CLEARANCES AS SHOWN ON DRAWINGS.
3. TANKS SHALL NOT BE PLACED ON EXISTING CONCRETE PADS IN FLOOR.
4. MAINTAIN 1'-0" CLEAR BETWEEN THE TANK AND TENT FABRIC.
5. AFTER INSTALLATION, PAINT EGRESS AISLES ON FLOOR. AISLE LINES SHALL BE 3" WIDE PAINTED FEDERAL SAFETY YELLOW. REMOVE ALL EXISTING EGRESS LINES WHICH CONFLICT WITH NEW EGRESS ROUTES.
6. SEE DRAWING 51006-401 FOR VENT PIPING.
7. SEE DRAWING 51006-750 THRU 756 FOR LEAK DETECTION SYSTEM.
8. THE LOCATION OF EACH TANK ON THE 750 PAD SHALL BE MARKED WITH YELLOW PAINT PRIOR TO PLACEMENT. THE MARK SHALL INDICATE THE OUTSIDE DIAMETER OF THE SECONDARY CONTAINMENT TANK. A MEMBER OF STRUCTURAL ENGINEERING SHALL CHECK EACH LOCATION FOR SMOOTHNESS PRIOR TO PLACING THE TANK. REPAIR OF THE SURFACE, IF REQUIRED, SHALL BE PER THE STRUCTURAL ENGINEERS REQUIREMENT.

LEGEND

- TANK TO BE INSTALLED AT A LATER DATE
- PLANT STD. TANK LABEL
- RCRA NUMBER

TANK RCRA NUMBER	PRIMARY TANK SERIAL NUMBER	SECONDARY TANK SERIAL NUMBER
25.001	C93-03432	C93-03370
25.002	C93-02950	C93-03374
25.003	C93-03315	C93-02940
25.004	C93-03356	C93-03348
25.005	C93-03345	C93-03304
25.006	C93-03053	C93-03046
25.007	C93-02899	C93-02961
25.008	C93-02881	C93-02895
25.009	C93-02967	C93-02979
25.010	C93-02939	C93-03058
25.011	C93-03333	C93-03312
25.012	C93-03102	C93-03338
25.013	C93-03091	C93-03095
25.014	C93-03072	C93-03076

KEYWORDS
1. ACCELERATED
2. SLUDGE
3. REMOVAL
4. PROJECT
5.

750 PAD
TENT 3

REV	DESCRIPTION	DATE				
B	CURRENT STATUS AS OF 1-4-94					
A	ORIGINAL ISSUE	11-17-93	LE	CB	KA	HS

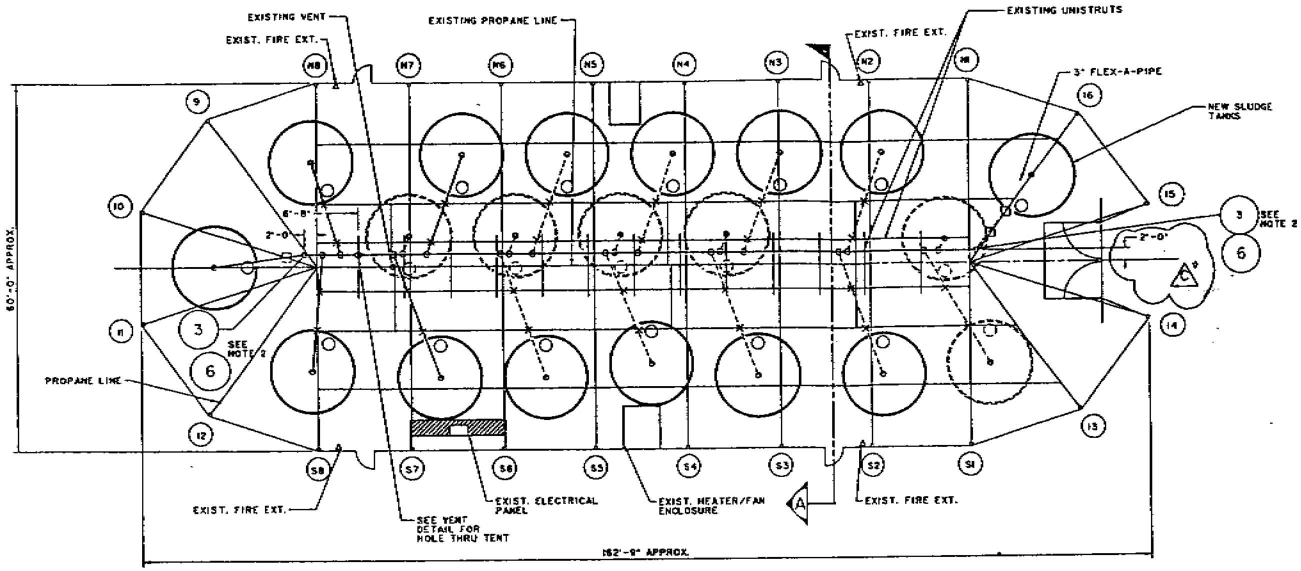
	BY	DATE
DESIGNED	EHRLICH	11-17-93
DRAWN	BROWN	11-17-93
CHECKED	ARNOLD	11-17-93
APPROVED	SAUNDERS	11-17-93

SCALE: AS NOTED

U.S. DEPARTMENT OF ENERGY
ROCKY FLATS OFFICE GOLDEN, COLO.
Rocky Flats Plant
GOLDEN, COLORADO
ACCELERATED SLUDGE REMOVAL PROJECT
TANK INSTALLATION PLAN & SECTION TENT 3

SIZE D | DRAWING NUMBER 51006-200 | REV. B

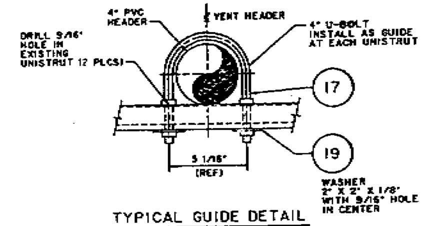
COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED
R.C.51006.200.B.CPB.TENT3



TENT 3

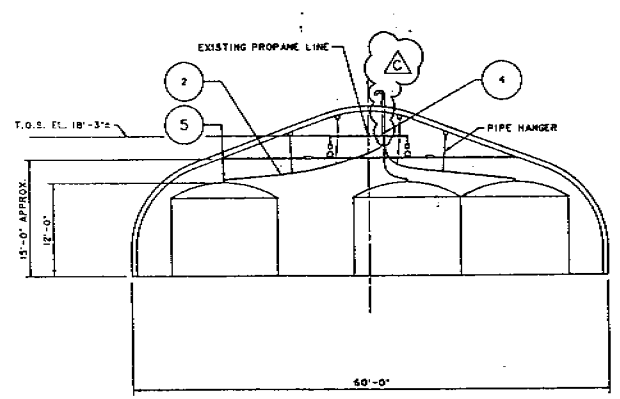
SCALE: 1" = 10'-0"

PART	QUAN.	DESCRIPTION	MATERIAL
1	120'	4" PIPE, SCH 40	PVC
2	400'	3" FLEX-A-PIPE, CENTRAL STATES HOSE, DENVER, CO	PVC
3	4	4" 90° ELL, SCH 40	PVC
4	18	4" X 4" X 3" RTEE, SCH 40	PVC
5	20	3" 90° STREET ELL, SCH 40	PVC
6	2	4" X 3" RED. BUSHING	PVC
7	3	1/4-20 1" LG BOLT & UNISTRUT NUT PN/1006TH20	C.S.
8	72	3" SPLIT RING PIPE CLAMP "GRINNELL" FIG 108	C.S.
9	800'	1/8" GALVANIZED STEEL CABLE MCMASTER-CARR PN/3450T26	
10	200	1/8" COMPRESSION SLEEVE MCMASTER-CARR PN/3272T14	
11	1'	1" X 1" X 1"LG -3/16" ANGLE	C.S.
12	100	1/4"-14 1" LG HIGH HILTI KWIK PRO SELF-DRILLING SCREW	C.S.
13	12	1/4"-20 X 1" LG BOLT & NUT	C.S.
14	15'	1 1/4" X 1 1/4" X 3/16" ANGLE	C.S.
15	6	4" PIPE CLAMP "GRINNELL" FIG 212	C.S.
16	3	6"DIA X 12" LNG SLEEVE WITH 3" GUSSET (CANVAS SPECIALTY)	
17	75	4" U-BOLT "GRINNELL" FIG 137	C.S.
18	1	4" TEE, SCH 40	PVC
19	150	2" X 2" X 1/8" WASHER	C.S.
20	3	4" HOSE CLAMPS	SS
21	3	1' X 1' FABRIC FLANGE (CANVAS SPECIALTY)	
22	A/R	PVC SOLVENT CEMENT PER ASTM D2564	



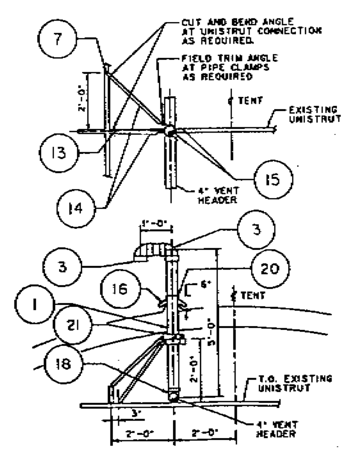
TYPICAL GUIDE DETAIL

SCALE: NONE



SECTION A

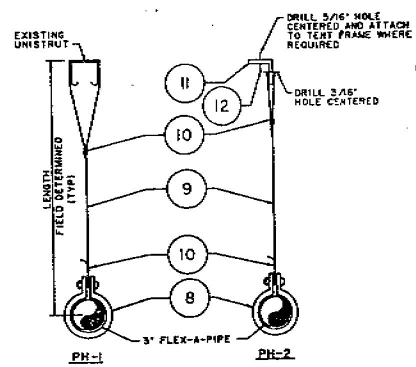
SCALE: 1/8" = 1'-0"



VENT & SUPPORT DETAIL

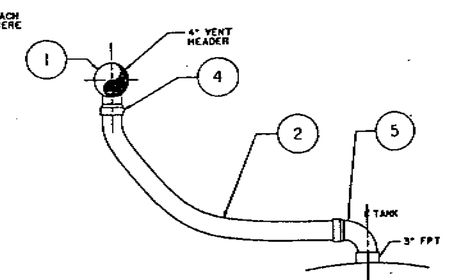
SCALE: 1/2" = 1'-0"

DETAIL AS SHOWN FOR TENTS 4 & 6. FOR TENT 3, MAKE ANGLE SUPPORTS OPPOSITE HAND.



HANGER DETAIL

SCALE: NONE



TYPICAL TANK TO HEADER CONNECTION

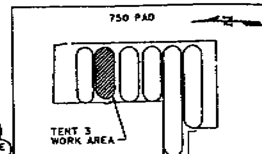
SCALE: NONE

HANGER LEGEND

X = PH-1 (TYP 26)
□ = PH-2 (TYP 3)

TANK LEGEND

TANKS AND FLEX-A-PIPE TO BE INSTALLED AT LATER DATE.



KEY PLAN

SCALE: NONE

NOTES:

1. INSTALL & SUPPORT FLEXIBLE LINES IN SUCH MANNER THAT LINES ARE NOT POCKETED.
2. INSTALL 4" 90° ELL WITH 4"X3" BUSHING AT EACH END OF VENT HEADER.
3. ALL DIMENSIONS FOR TEE LOCATIONS (IF GIVEN) ARE APPROXIMATE. FIELD VERIFY BEFORE FABRICATING HEADER.
4. USE PH-1 HANGER WHERE UNISTRUT IS AVAILABLE. USE PH-2 HANGER WHERE UNISTRUT IS NOT AVAILABLE
5. ALL PIPE & FITTINGS ARE TO BE SOLVENT CEMENTED
6. CANVAS SLEEVE WITH 3" GUSSET ON OUTER WALL AND REINFORCING FABRIC FLANGE ON INTER WALL TO BE INSTALLED USING HOTAIR WELDER (ALL AREAS TO BE CLEANED WITH MEK BEFORE BEING WELDED)

C	CURRENT STATUS AS OF 1-6-94 ... RELOCATED VENT ...	1-5-93
B	CHANGED 2" FLEX PIPE & FITTINGS TO 3" PER ECN ...	12-7-93
A	ORIGINAL ISSUE	11-30-93

KEYWORDS: 1. ACCELERATED 2. SLUDGE 3. REMOVAL 4. PROJECT

750 PAD — TENT 3

DESIGNED 11-15-93; DRAWN 11-22-93; CHECKED 11-30-93; APPROVED 11-30-93

U.S. DEPARTMENT OF ENERGY
ROCKY FLATS OFFICE, GOLDEN, COLORADO

Rocky Flats Plant
GOLDEN, COLORADO

ACCELERATED SLUDGE REMOVAL PROJECT

TANK VENTING PLAN, SECTION & DETAIL TENT 3

SCALE: AS NOTED

SIZE D — DRAWING NUMBER 51006-401 — ISSUE C

RRP 1-6-94 COMPUTER GENERATED R.P.51006.401.C.SEF.TENT3